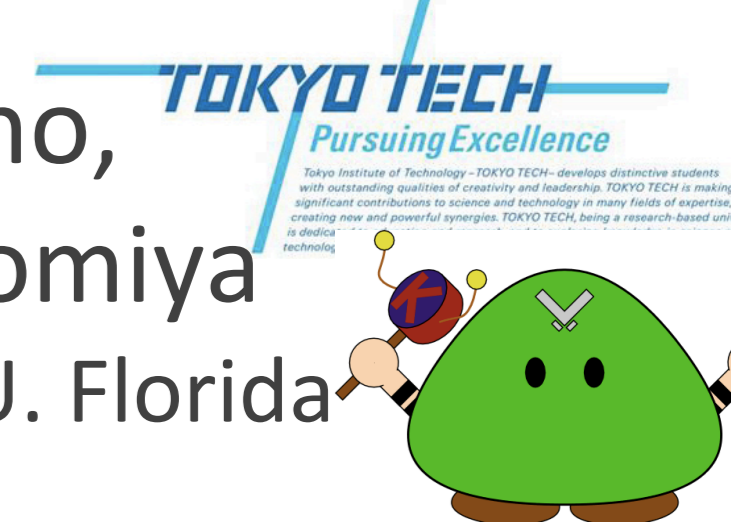


Installation of the input optics in the underground site of KAGRA

K. Yano, Y. Kataoka, T. Kagawa, M. Nakano, C. Mueller, R. Goetz, D. Tanner, and K. Somiya
Tokyo Institute of Technology, ICRR, U. Toyama, U. Florida



KAGRA site

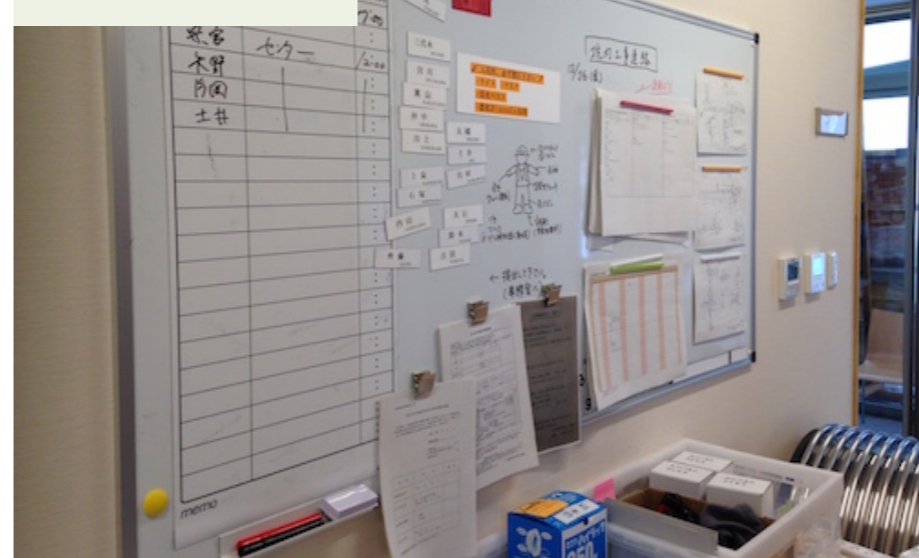


Office



We can reach the KAGRA site in about 15min from the office.

Board



We should write each name of the person who enters the tunnel.

Cars



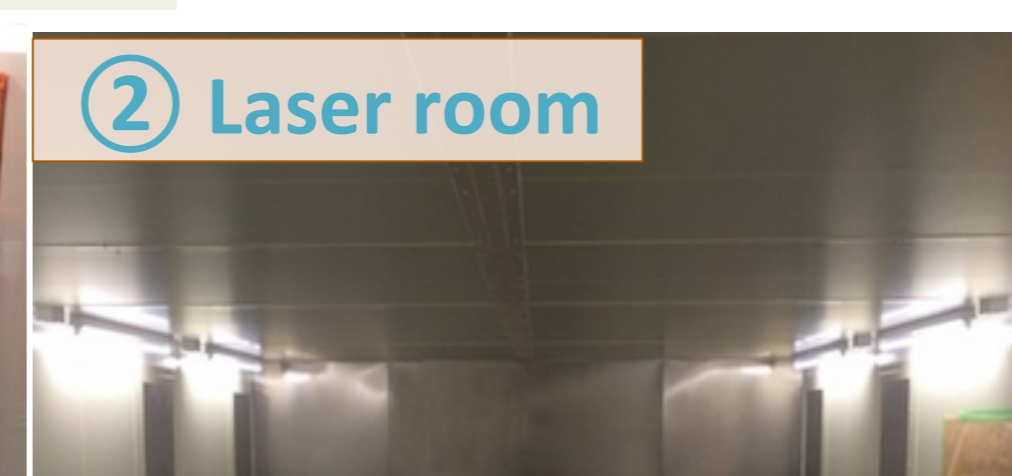
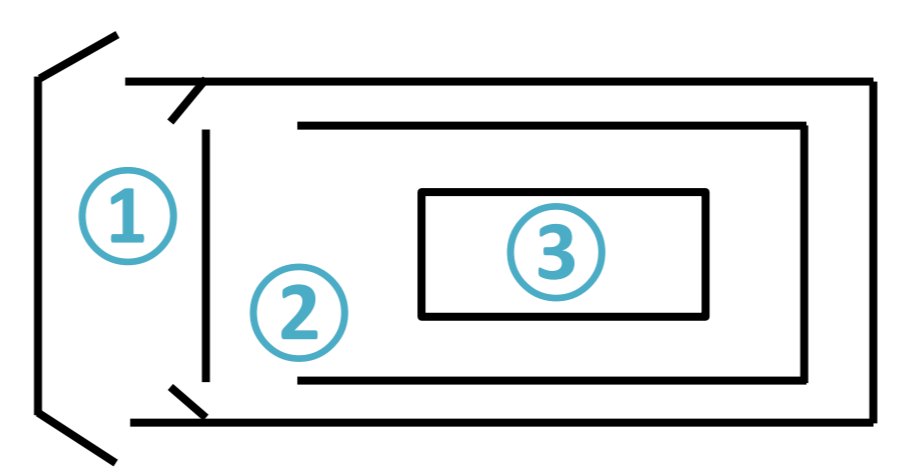
KAGRA has 3 cars (2 diesel & 1 electric car) we can drive in to the tunnel.

Bear



In the Kamioka area we sometimes meet bears in autumn.

Clean room @center of the tunnel



inside the tunnel

- We can only use limited chemicals for cleaning.
- We cannot eat anything.
- Construction & installation continue.
- **Bad environment** (dust, humidity, water, etc...)

Installation

PSL (Pre Stabilized Laser) building

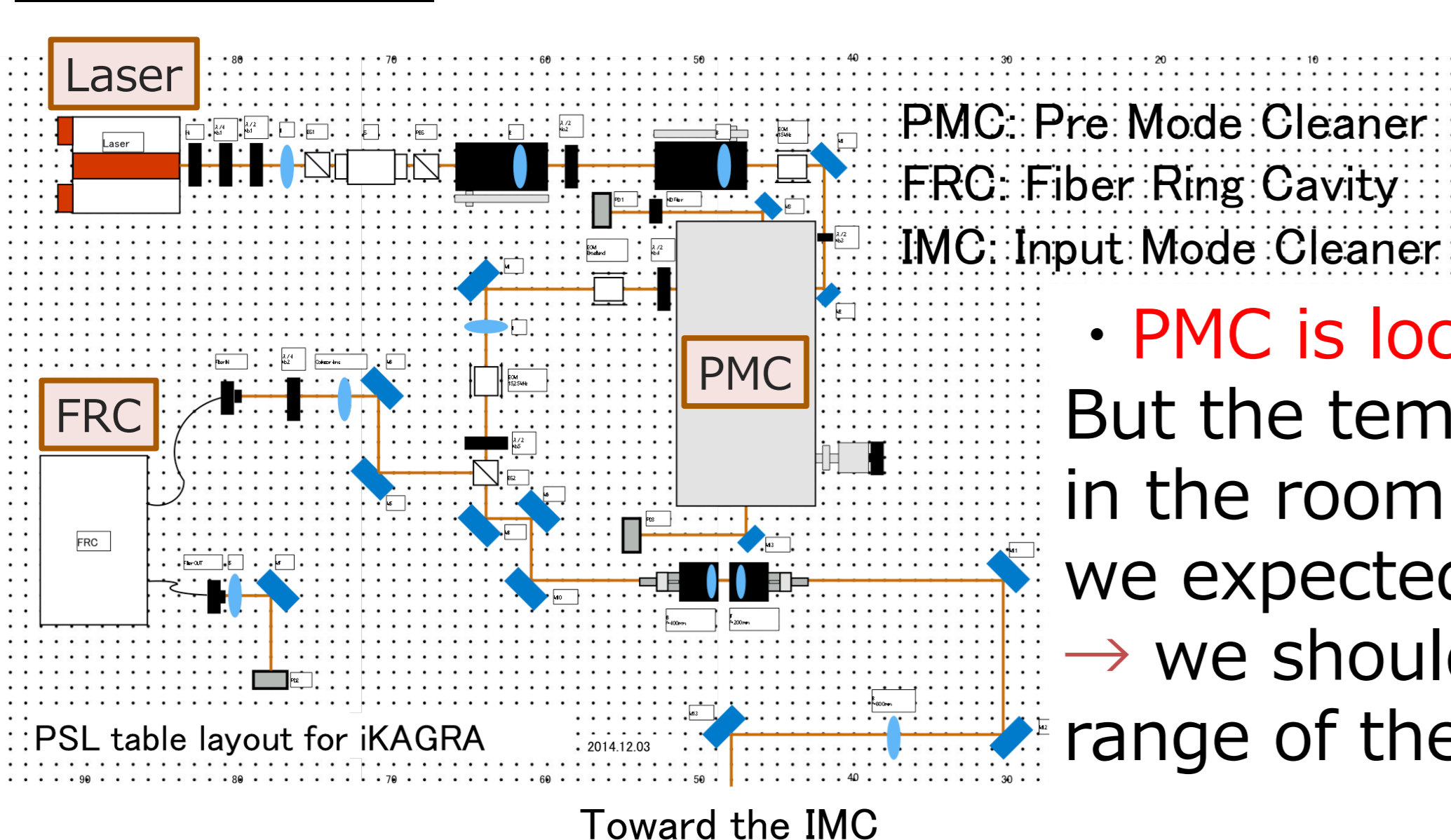
Clean the room

1. Wipe the floor and wall with water.
2. Wipe with diluted ethanol.
3. Cover uncoated floor by plastic sheets.

Install the optics & tools

1. Blow with the air compressor @outside.
2. Wipe with diluted ethanol @anteroom.
3. Wipe with pure ethanol @clean room.

Built the PSL



- **PMC is locked 27 hours.** But the temperature stability in the room is not as good as we expected.
- we should increase the range of the control.

Future works

- Install the optics after the PMC (FRC, IMC).
- Improve the PMC range.

IFI (Input Faraday Isolator) assembly

Install parts & tools

IFI parts were clean-and-baked in U. Florida. But there were no baked imperial tools. → Sent from UF (**took a few days**)

Assemble the IFI

We shipped some equipment from Tokyo Tech for the assembling. During the assembly, we dropped the CWP. We measured with the broken one.

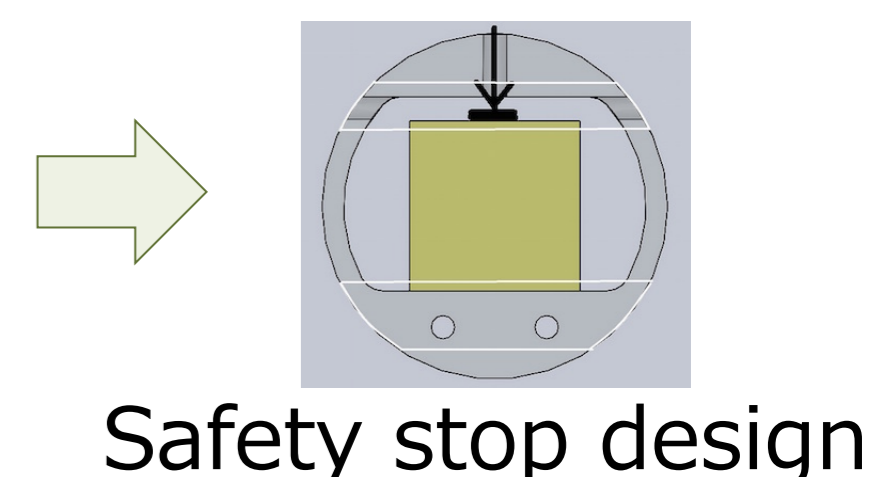
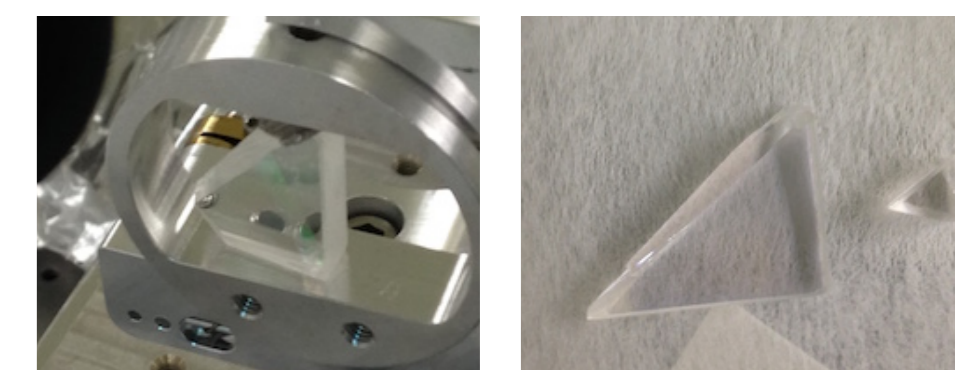
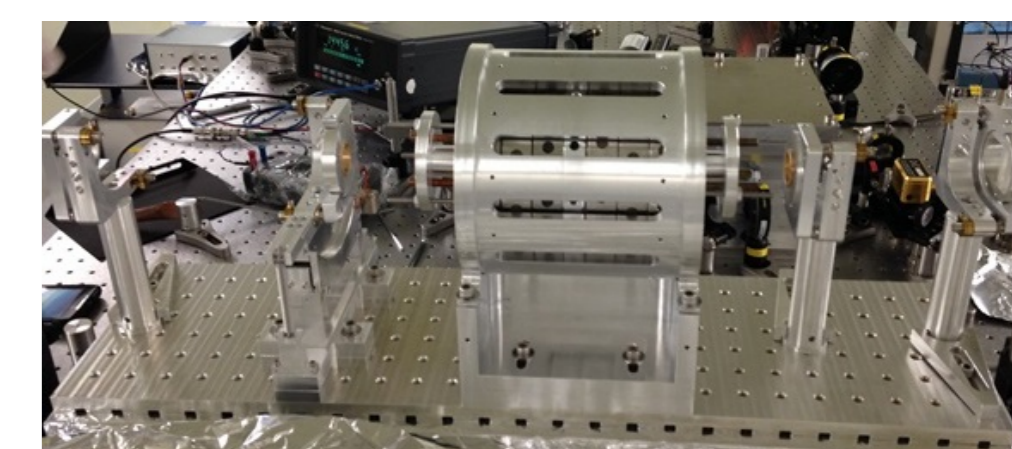
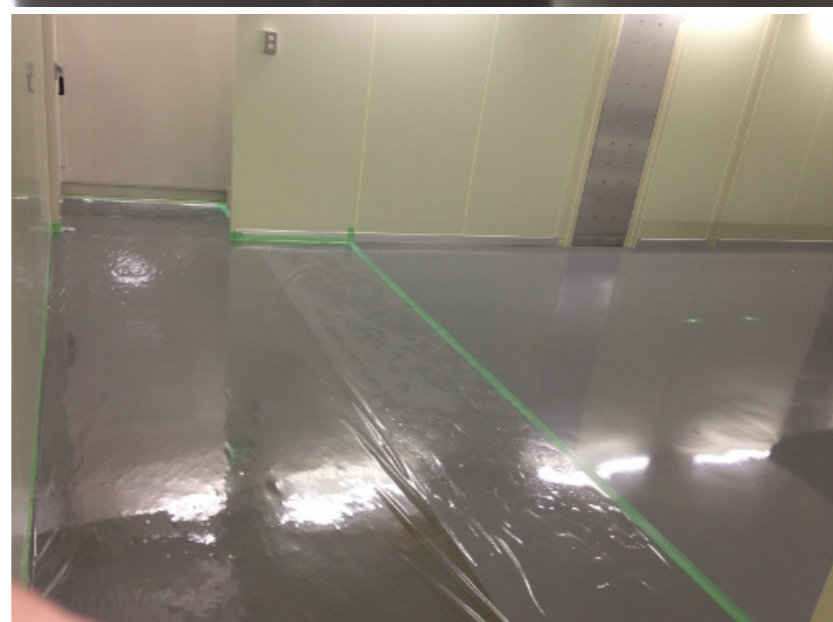
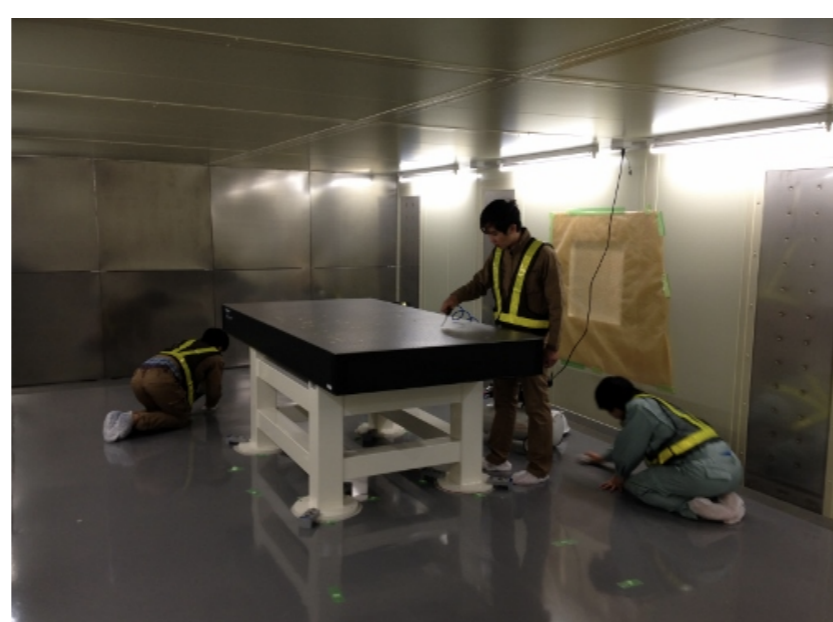
Measure some parameters

The broken CWP may have invisible cracks. So we replaced the broken one by a new one. But we dropped it again. Fortunately the CWP was not broken. We should prepare the safety stop.

We achieved **Transmittance — 93 % (w/o DKDP)**
Isolation ratio — 41 dB

Future works

- Optimize the transmittance.
- Install it in the vacuum chamber.



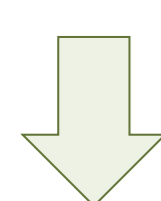
Safety stop design

Issue

Water spring

Dirty water came out from the floor.

12/15 2014 Wipe the water immediately.



Check spring points.

Investigate the water.

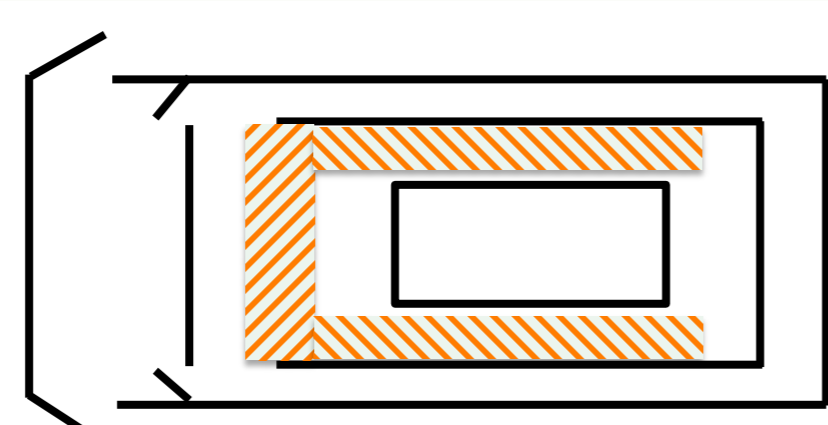
pH: 10, dissolved concrete

2/3 2015 Countermeasure.

with plastic pipes & hygroscopic papers

Gradually the area of water spring is expanding.

Now we are discussing this issue.



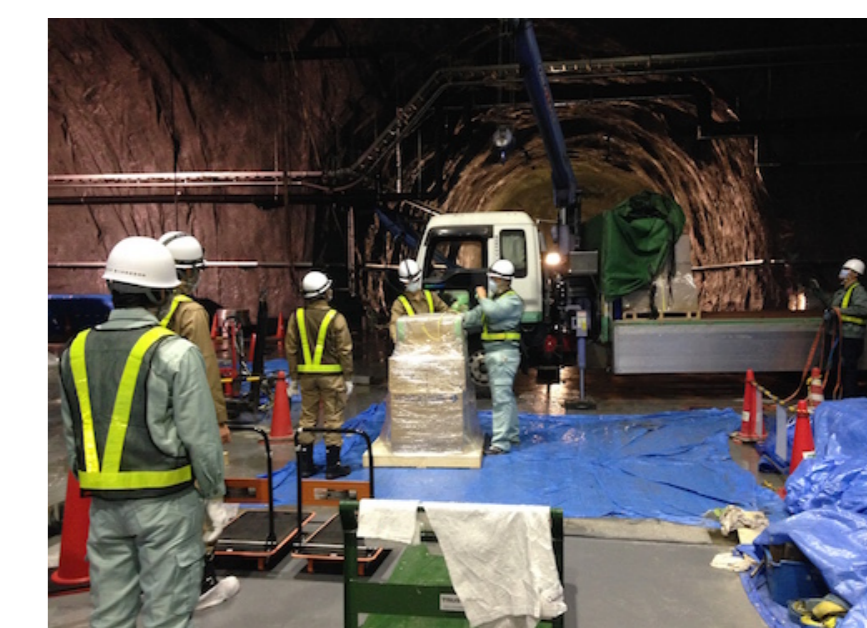
Near miss

Some near misses happened during the work.

- Work under a heavy suspended stuff.
- Work w/o taking a break.
- Put a finger in a heavy unfixed equipment.



- Safety lecture
- Morning meeting
- Revision of safety manual



Most of us are not used to the work in the tunnel. So we recognize a lot of risks **only after we start working.**